

REMARKS

Applicant has considered the application carefully, following receipt of the Office Action, and consequently, has redrafted the claims to overcome the formal objections raised in the Action. Original claims 1 to 27 have now been replaced by claims 28 to 53. These new claims comply with Section 112 in all respects, and especially distinctly claim the invention and particularly point out the novelty and unobviousness.

The objection to the drawings is taken care of by the addition of three new Figures 3A, 3B and 3C which show, respectively, accelerating nozzles surrounding the two propellers, decelerating nozzles surrounding the two propellers, and the hydraulic motor and the hydraulic lines leading to the watercraft to the source of hydraulic energy. The basis for these drawings can be found in the specification in paragraphs [00017], [00018], [00019], [00034], [00035], [00036], [00037] and [00067]. In addition, original Figure 3 shows a nozzle surrounding both the front and rear propellers. The new drawings are entirely consistent with the original drawings, and do not contain any new matter. They particularly comport with the descriptions already in the specification at the locations identified.

There are a couple of misconceptions stated in the Office Action with regard to the claimed invention. The first misconception concerns the relation of the control means to the reduced diameter of the flowing stream from the first propeller to the second propeller. The control means has nothing to do with the fact that the diameter of the jet stream being pumped from the first propeller is smaller. The fact that the diameter of the jet stream leaving the first propeller is of smaller diameter is a simple and fundamental principle of fluid mechanics. The diameter of a flowing stream depends on its velocity. As the velocity speeds up, the diameter becomes smaller, because the mass flow is the same. One sees this principle at work in a Venturi tube. Therefore, in the context of the present invention, ambient water is presented to the first propeller to be acted upon. The action of the first propeller is to pump this ambient water to a certain velocity. Due to the above stated principle of fluid mechanics and simple mass flow theory, the velocity of the pumped flowing stream is increase, and therefore, its diameter is reduced, in order that

the mass flow is the same. This is standard and well known fluid mechanics, especially in the marine field. The second propeller receives this reduced diameter stream of high velocity water, and pumps it to a further velocity, impelling the watercraft forward. As the two propellers are of equal diameter, only a central portion of the second propeller, of equivalent diameter to that of the reduced diameter stream of high velocity water, will encounter the reduced stream and pump it to a higher velocity. Meantime, the annular portion of the second propeller, radially or peripherally outside the diameter of the reduced stream of high velocity water, will be encountering and acting on ambient water, somewhat in the manner of the first propeller. This is the essential point of the present invention. From a knowledge of the present invention, to calculate the specific design of the two propellers for any watercraft is a very simple and straightforward matter for any marine engineer of ordinary skill in the art, without the necessity for any experimentation whatsoever.

The second misconception concerns the control means. The new claims have been drafted so that the control means is better recognizable. According to claim 28 The control means is expressed in limitations (f), (g) and (h) as follows:

- (f) control means disposed between said front and rear propellers, for increasing the energy of a jet of water exiting the front propeller as said jet is transmitted to the rear propeller;
- (g) said control means acting on the water jet leaving the front propeller with both circular and axial flow components to reach the rear propeller substantially with axial flow components only;
- (h) said control means comprising, (i) a hollow shaft having an upper end connected to said hull and a lower end, (ii) a gondola-shaped underwater housing mounted on the lower end of said hollow shaft and containing said watercraft drive with said at least one drive shaft extending from opposite ends of said underwater housing, and (iii) a plurality of guide blades connected to at least one of said hollow shaft and gondola-shaped underwater housing;

Thus the function of the control means, made up of the components specified above, is to eliminate the circular flow components, and leave substantially only axial flow components in the water flowing from the first propeller to the second propeller. Since the first propeller is operating in a rotary fashion, it will not only impart an axial force to the water being pumped, but will introduce a torsion or circulatory force. According to the claimed invention, elimination of the circulatory force will increase the energy of the flowing stream.

Understanding the simple fluid mechanics noted above, any marine engineer of ordinary skill in the art and "worth his salt" can readily determine, without any experimentation, what the central portion of the rear propeller is that has a diameter equivalent to that of the flowing high velocity stream of water. If one knows what the central portion is, there is no magic in knowing what the remaining peripheral portion is, referred to in the claim as "an annular area extending from said central portion to the outer circumference of the rear propeller". Accordingly, the disclosure is clear and unambiguous to any marine engineer skilled in the art.

The claims have been revised to eliminate any mystique regarding the design of the first propeller. It is what ever it is supposed to be depending on the watercraft. It is only the second propeller that requires special design in its central portion. The annular area of the second propeller is essentially of the same design as the first propeller, because it is acting on ambient water in essentially the same manner as the first propeller, and not on the high velocity water that the central portion of the second propeller is acting on.

The comments in the Office Action regarding the nozzles belie the fact that a nozzle is shown already in Figure 3. For a nozzle to be accelerating, the cross section must decrease from the entry into the nozzle to the plane of the propeller. For a nozzle to be decelerating, the cross section must increase from the entry into the nozzle to the plane of the propeller. This is elementary nozzle design and precisely what is stated in the specification, and proposed to be illustrated in Figures 3A and 3B. There is no

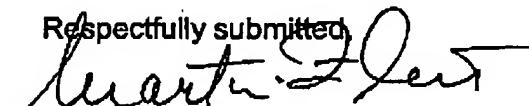
mystery regarding the position or the support. The nozzles are supported from the frame of the gondola, as is everything in it. Regarding position, every nozzle to be effective must start before the propeller and carry on at least until the plane of the propeller, as stated in the specification.

Admittedly, the drawings are somewhat schematic, but they are easily understood by marine engineers of ordinary skill in the art, and practice of the invention from the disclosure can be easily and readily accomplished without any need for experimentation. All prior art of record has been distinguished and it is noted that only formal objections were applied in the Office Action; no prior art was applied.

In light of the foregoing remarks, this application should be in condition for allowance, and upon approval of the drawing corrections, early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time, time sufficient, to effect a timely response, and shortages in this or other fees, be charged, or any overpayment in fees be credited, to the Deposit Account of the undersigned, Account No. 500601 (Docket no. 7700-X03-010CIP).

Respectfully submitted,


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